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The Usage of Jewelry Under the Emotional Design Approach to Improve the Self-Image of Hearing Aid Users

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Abstract

One of the issues that has always beset humanity throughout history is hearing loss, which continues to impact a sizable portion of the population despite advancements in technology and medicine. These individuals must use cochlear implants or hearing aids to make up for their organ defect; additionally, this product makes up for the defect as a rehabilitation tool and aid; however, it also serves as a symbol of the deaf or hard of hearing user's disability, which may cause this group to be viewed differently from other members of society. This research is conducted to explore if incorporating aesthetic principles of jewelry into hearing aids can evoke positive emotions regarding the user's self-perception and is divided into two sections: firstly, investigating the connection between emotional design and jewelry design through library research, and then the results are used to create a sample of behind the ear hearing aid that double as jewelry based on mood board of jewelry and silhouettes of hearing aid general forms. The designed sample is compared with the representative examples of this product in the market using the Kansei engineering method, and the semantic separation technique is used to extract the feelings of the user concerning self-confidence and self-image. The results obtained in this research show that hearing aids as jewelry induce more positive emotions such as the desire to show off and a sense of self-confidence in users in comparison with other products of this kind, which is directly related to the users' self-image of this product.

Keywords

Jewelry, Emotional Design, Hearing Aid, Self-Image.

Introduction

According to the World Health Organization (WHO) report, about 360 million people in the world are suffering from hearing problems, which is about 3.5% of the world's population (WHO, 2012). A person who cannot hear the 25-decibel sound with both ears has hearing loss, which can be in slight, average, or deep area; and in the range of conversations or loud sounds. These people use hearing aids and cochlear implants (WHO, 2013). Hearing aids are sound amplification devices designed to help people with hearing impairments (Oxford, 2022), which improve the social accessibility and life quality of people with hearing problems. However, using these assistive devices may create concerns among some users according to social and cultural issues, such as attracting unwanted attention and resulting feeling of being labeled, and affect the attitude of these people themselves (Profita et al., 2016). This is While Products in human life are more than mere possessions). People use them to gain honor and not only to show the power and status of their society, but because of the meaning which these products give to their lives (Emami et al., 2018). In today's products aesthetics can cause positive feelings in users and increase their self-esteem and create a strong connection between the user and the product which is considered as one of the most important points of design (Abadi et al., 2018). This communication is in the center of attention in the emotional design; which is a scientific approach that concentrates on the feelings and effects that can be caused by products on their users (Khodadadeh & Rostamkhani, 2009).

In the field of designing products related to the medicine and auxiliary, the attention of manufacturers has always been on the practical features of these products. Two things are important in design First, the aesthetic issues and communication that it creates with the user, and secondly, the interactive design and safety issues, which means that in different industries, different levels of aesthetics are used in product design, in the design of products related to this field, the least aesthetics are used (Rohani Farahmand, 2013). Aesthetics is also known as an integral part of jewelry (Solomon, 1983). Which is a sign of social status and an expression of relationships or as a stimulus for people's memories (Wolfinbarger, 1990). This aspect of jewelry can be used as a solution in designing of hearing aids with emotional design approach.

Studies have investigated the role of aesthetics in the design of hearing aids and report the efforts of some manufacturers and users to add aesthetic elements to this product as a reaction for reducing the negative social and cultural effects of this assistive product. In this research, the concept of the aesthetic design of hearing aids as jewelry is discussed with the emotional design approach, a platform for applying jewelry's aesthetic and elements in designing products like hearing aids for fulfilling emotional aspects in users of this product so that it can be used to compensate for the shortcomings in the individual feelings of hearing aid consumers. A sample of hearing aid based on the outcomes of this idea is designed and compared with other hearing aids lately produced in the world to show the emotional impacts on the users, especially for examining if it evokes positive feelings in the consumers of these products or not.

Literature Review

Several studies have investigated the role of emotional design in industrial products and its impact on the image users have of themselves. On the other hand, studies in the field of rehabilitation products and hearing aids have investigated the effect of the appearance of these products on the consumers of this product and have emphasized the psychological effects of using these products on the users. Also, jewelry's aesthetics and cultural and symbolic impact have been at the center of attention in studies related to this group of artifacts. In the other area Studies trying to respond to the effects of using hearing aids have provided solutions based on making changes and personalizing this product. However, there are no comprehensive studies that have studied hearing aids based on an emotional approach or that have proposed jewelry as a response to the needs of product consumers. A summary of the studies related to the subject is briefly presented in the table below.

Table 1: *Summary of previous studies related to the subject.*

	Research Title	Authors	Research Findings
1	Self-Affirmation through the Choice of Highly Aesthetic Products	Townsend & Sood, 2012	the attractive design of a product has the same effects as a person's physical attractiveness. In addition, they suggest that, based on studies on personal values, aesthetically designed products are actually a form of self-expression.
2	Design of Customizable Expressive Jewelry for Generation Z	Kusuma et al., 2021	This article explores the design of customizable expressive jewelry specifically aimed at Generation Z, focusing on how such designs can incorporate self-affirmation elements to enhance personal identity and emotional expression. The result of this study is a handful of customizable components which are able to be assembled into earrings, necklaces, and bracelets.
3	Nothing to Hide: Aesthetic Customization of Hearing Aids and Cochlear Implants in an Online Community ASSETS	Profita et al., 2016	The study and experience of analyzing the posts and examples shared in this forum led to a greater understanding of user preferences in customizing these products in a DIY way to customize and improve these products. Understanding how to design in these online communities and these customizations provides the basis for the creation of custom assistive devices that enable users to express themselves proudly to others.
4	Power, Self-Esteem, and Body Image	Körner & Schütz, 2023	they expected power – the perceived capacity to influence others–to be an antecedent of positive body image because power is closely linked to self-esteem, which in turn is linked to body image. In a cross-sectional study sense of power was positively related to body appreciation and satisfaction with one's appearance. Self-esteem partially mediated this effect.
5	Adolescents' Aesthetic and Functional View of Hearing Aids or Cochlear Implants and Their Relationship to Self-Esteem Levels	Ellington & Lim, 2013	These studies provide a clearer picture of the needs of teenagers with hearing loss and provide information needed by professionals in this field. In the end, they also point out that designers, audiologists, pathologists, and educators are in a unique position that with their participation, they can positively affect teenagers and raise their self-esteem by meeting the aesthetic and functional needs of these products.
6	Social-Emotional-Sensory Design Map for Affective Computing Informed by Neurodivergent Experiences	Zolyomi & Snyder, 2021	The article explains that the emotional experiences of autistic adults are embodied and co-constructed within the context of physical environments, social relationships, and technology use, and conventional approaches to visually representing emotion in affective education and computing systems fail to accurately represent the experiences and perceptions of autistic adults and contribute a social-emotional-sensory design map to guide designers in creating more diverse and nuanced affective computing interfaces that are enriched by accounting for neurodivergent users.
7	Exploring Emotions: Study of Five Design Workshops for Generating Ideas for Emotional Self-report Interfaces	Nave et al., 2023	What this article presented is investigates the design process of emotional self-report interfaces through a series of five workshops aimed at generating innovative ideas. The study focuses on understanding how emotions can be effectively captured and represented in user interfaces.

Defining Emotional Design Concept in the Designing Hearing Aid as Jewelry

Emotional design describes how humans are able to understand the world using emotions (Ajdari & Krimpoor, 2017). The focus of this model is on three specific types of emotional reactions of users (three levels of cognition) to products (Norman & Ortony, 2003). In this model, human characteristics are the result of three levels in the brain consisting of the upper cortex of the nerves, which is the level related to external perception and is called the instinctive level; The behavioral level which is the part of the brain that processes are related to daily activities and controls them automatically and the last one is the part of the brain that is related to thoughts is called the reflexive level. Each of these levels has a different role in human performance and when activated, it can affect other levels (Mohammad Gholi Zadeh, 2012; Norman, 2010).

The visceral level sparks the initial thinking, and creates a reaction to the appearance of the design, and makes the initial impressions in the brain (Ho & Siu, 2012). Responses at this level of cognition are happening at the moment and create an emotional state that is relatively unaffected by context or background (Norman & Love, 2004). This level creates immediate and powerful responses (Fishwick, 2004). Which are involuntary, unconscious, and Informs the brain. These quick judgments are made in biological ways and can be affected by the environment in which they are perceived or other levels and have a close relationship with body muscles (Wrigley, 2013).

The behavioral level interprets available sensory data to diagnose or judge the performance, usage, and quality of a product. and includes values such as usefulness and functionality or reaction to a function. Reactions evoked from this level can enhance or inhibit instinctive-level reactions (Wrigley, 2013). In this level appearance is not important, logic is not important, but the question of application is very important (Norman, 2010). The design shows its behavioral characteristics with its performance (Mohammad Gholi Zadeh, 2012). That's why This stage is also called the level of user knowledge of product use (Persada, 2018). This level is responsible for the way of use and experiences that have already been created in using the product. the experience itself has various forms: performance, execution, usability, and usefulness. Product functionality defines what activities it supports and what it does. If the performance of the product is defective, the product will have little value (Mohammad Gholi Zadeh, 2012).

The reflective level is the most advanced processing level of the brain due to reflective thinking (Wrigley, 2013). Reflection is at the highest level of processing, i.e. people measure their actions and understanding and monitor their progress. This courtship is *self-image* and a wide range of emotions such as pride, shame, admiration, and gratitude (Norman & Ortony, 2003). It is only at the reflective (thinking) level that awareness and high levels of emotion, feelings, and knowledge are involved. This level is cognitive (Persada, 2018). The full encounter of a person's thoughts and feelings is experienced at this level, the meanings, the image that a person has of himself, and the message of the product are placed at this level of cognition (Norman, 2010). The design imperatives include the feeling of satisfaction from owning the product and its display. The clothing one chooses is often deliberately chosen to convey a message about one's social status and role in an activity. This is why reflexive-level responses are also called *mental induction* (Norman & Ortony, 2003).

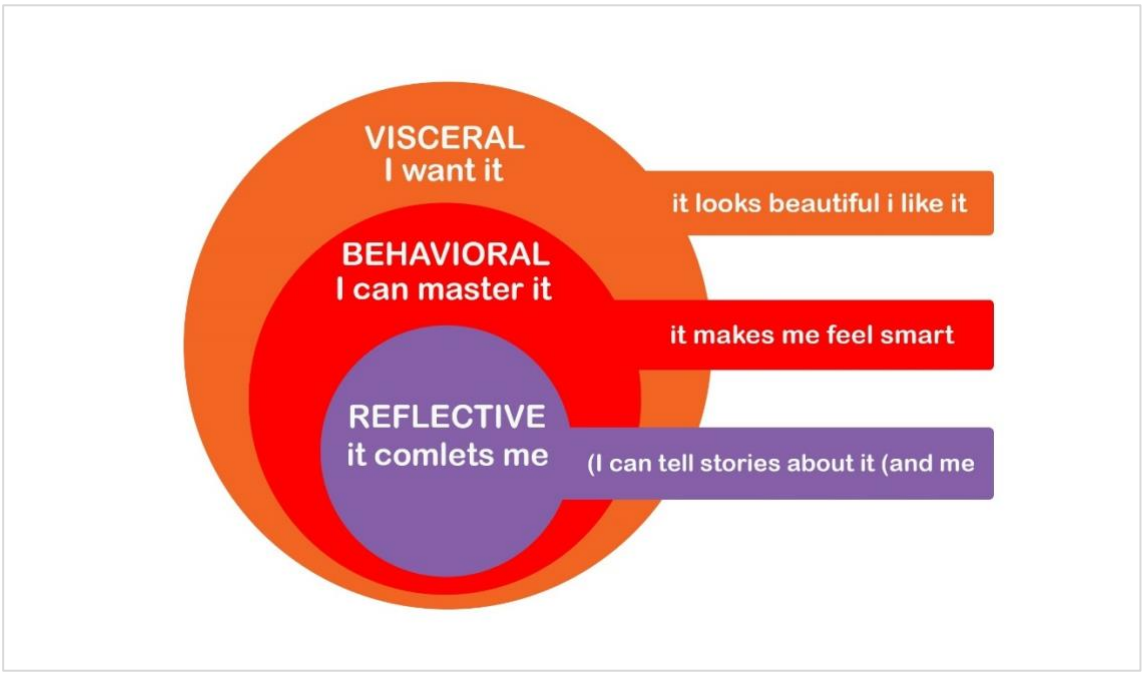

Figure 1: *3 levels of design appeal (Kamil & Abidin, 2013).*

Although the visceral, reflexive, and behavioral processing levels are different. Still, they are interwoven and are in the heart of all products, the important thing is how these three can create perception and feeling (Mohammad Gholi Zadeh, 2012). Attraction is a phenomenon related to the visceral level, a reaction that generally arises from seeing the appearance of a thing. But Aesthetics come from the reflective level. Aesthetics is concerned with the inner role of a thing and not its appearance. Beauty comes from conscious thinking and experience and is influenced by knowledge, culture, and learning (Norman, 2010).

At the visceral level, design often focuses on universal responses that occur automatically (Demir, 2008). At this level, consumers receive the first signals from the design results, which are products, and establish the first emotional connection between the user and the product. Jewelry design is also not something separated from form development and the visual quality of a design is one of its basic issues. The form can be defined as the composition of matter and product entity and the interpretation created from its appearance. In jewelry, form analysis is based on its appearance. As a result, message transmission in these products is mostly done through their aesthetic functions. In the interpretation of the form of jewelry, the main concept lies in paying attention to its gestalt (Chitsaz et al., 2019). Also, Color is one of the main elements in attracting the attention of the audience. Color can be one of the most effective design tools to convey a message to the audience in a crowded visual environment. Also, color is related to meaning and evokes emotions that can affect a person's conscious or unconscious mind (Aftab & Rusli, 2017). Color is also very important in the emotional impact of jewelry on people. Therefore, in creating jewelry, the designer can use color to direct the emotions of its owner (Gong & Yuan, 2017). In hearing aids, materials such as plastic, leather, and fabric covers are usually used (Schmidt et al., 2008).

The materials used in the design and manufacture of jewelry range from precious metals to stones and various types of plastics, which with their natural appearance and texture can attract the attention of the audience and arouse their instinctive emotions. In the design of the hearing aid, it can be used independently or in combination with other materials used in the design and manufacture of the hearing aid as the main body or aesthetic appendages, taking into account the principles of hearing aid design and ergonomics.

The most important aspect of the behavioral level is that every movement and action is related to an expectation, the expectation of an output, and feedback provides this certainty (Norman, 2010). In the design of the hearing aid, the indicators and controllers can be replaced with the materials used in the design of jewelry, so that in addition to the positive emotional effects due to the material and color stimulate the instinctive level as an indicator for the users, which also can differentiate and control more.

The reflective level is the most advanced processing level of the brain due to reflective thinking (Wrigley, 2013). The full encounter of a person's thoughts and feelings is experienced at this level, the meanings, the image that a person has of himself, and the product's message are placed at this level of cognition (Norman, 2010). The design shows the applied logic behind the product at this level (Mohammad Gholi Zadeh, 2012). This includes clothing that one often chooses deliberately to convey a message about one's social status and role in life. This is why reflexive-level responses are also called *mental induction* (Norman & Ortony, 2003).

Most people need to feel good about themselves. Research shows that people want to strengthen their positive view of themselves and are looking for information that will sustain their positive view of themselves (Briñol et al., 2007). At the reflective level, individuals measure their actions and understanding and monitor their progress. This courtship is *self-image* and a wide range of emotions such as pride, shame, admiration, and gratitude (Norman & Ortony, 2003). Jewelry is linked to people's identity and self-expression too. Therefore, it can be seen how body ornaments strengthen identity and social status and give a person special dignity (Venkatesh et al., 2010). These artifacts can be considered as a public aesthetic display that conveys the user's style, tendencies, and socio-cultural status to others (Rantala et al., 2018). The body and clothes are complemented by jewelry and as a display of possessions, it tells a personal narrative and then communicates with others through this means of display (Ahde-Deal, 2013). Jewelry is considered a suitable platform not only for adorning and beautifying the human body, but also as objects with social-cultural value and a sign of social identity, social and economic status, and other cultural aspects of society. It is also used for religious purposes and on the one hand to increase self-esteem. Except for some cases, jewelry is mainly used as personal adornment and has no other purpose apart from looking attractive (Satpathy, 2017).

A hearing aid as an assistive device is a symbol of a hearing problem that can affect social, and personal relationships and a person's identity; The highest goal of emotional design at the reflective level is to affect a person's self-image and social identity. The use of ornaments in the design of hearing aids can meet this need so that hearing aids can be transformed from an auxiliary product into a beautiful product that is a symbol of taste, social status, and a display of a person's identity. Modifying the body using jewelry is a practice that has already been common among different cultures of the world in ancient times. In addition to having a specific symbolic value, these modes of body modification allow the user to adhere to certain aesthetic criteria (Cappellieri et al., 2019).

Methodology

In this study, the idea of designing hearing aids as jewelry is tested by using the concepts of emotional design, after applying the principles of jewelry design with an emotional approach. A sample of this product is designed based on the conducted studies, and the designed product is compared and evaluated with the current market samples using the Kansei engineering method. Kansei engineering is a method to reveal the inner feelings and emotions of users facing a product. which helps the process and development of product design to create features in the product that lead to the desired reaction of users (Emami et al., 2018). In this study, Kansei's 3rd type is used; In this method, which is also called backward Kansei engineering, the designer provides his ideas to the system, and this system analyzes the product parameters compares them with his information, and connects them with Kansei emotions, and Kansei's words are provided to the designer at the end. In some cases, progressive and backward engineering are combined (Koleini Mamghani, 2017). Based on the mentioned method, the amount of emotions evoked by each of these products was extracted and evaluated.

Hypotheses

The hypothesis that this study aims to address is that using the concepts and aesthetics of jewelry based on the logic of the emotional approach in the design of hearing aids will create positive feelings in users compared with other products of this type of device.

Designing Sample

Based on the library studies, Aesthetic elements in emotional design are form, material, and color.

The form should show the characteristics of the product to communicate with the audience and attract them. In emotional design, there is no limit to the use of geometric and non-geometric forms (Emami et al., 2018). But the organic form communicates with the audience with its semiotic potential. In addition to aesthetics, the form should show function (Bagheri, 2012). The design of modern jewelry has more variety in form and includes abstract geometric modeling to special natural shapes and from simple forms to complex models. All of these are forming that designers can express through elements to express their feelings. Designers can express themselves through the elements of points, lines, planes, and volumes and according to rules such as contrast, rhythm, repetition, etc. For geometric ornaments, creating logical, cold, hard, and linear feelings creates a relatively strong and abstract visual impact. But it makes the audience have limited ideas in mind. Designers also use specific patterns of nature to express their feelings or attitudes (Gong & Yuan, 2017).

In emotional design, the color should be appropriate to the function of the object and the characteristics of the target group, and it can be harmonious or contrasting with other elements (Hakimi Tehrani, 2016). Color is one of the most important sensory elements of the product and expresses the personality characteristics of the consumer. There is no specific pattern of color in emotional design and it follows pluralism (Bagheri, 2012). Emotional understanding of products can be created in the audience through their gender. By using special materials, a special style and character can be given to the products. Through sight and touch, one can understand the type of material (Crippa et al., 2012).

A significant part of jewelry is made with precious materials. These materials and materials include metals such as gold, silver and precious minerals such as diamonds, rubies, emeralds, etc., and other natural products such as amber and pearls. Resin, polymer clay, rubber, ceramics, textiles, seeds, dried flowers, and many others are used. The jewelry designer has unlimited freedom in creating shapes and using materials for his design (Arumsari, 2015).

In this study behind-the-ear hearing aid form is chosen as a sample for the design, behind-the-ear hearing aids have the largest size and weight, but they have the highest degree of fitting and are comfortable, while in-canal hearing aids have the smallest size and weight, but also have the least comfort and fit (Fu & Luximon, 2020).

Up-to-date examples of jewelry related to the ear were selected based on the modern and emotional design style and collected for modeling on the mod board. The most popular raw forms of behind-the-phone hearing aids were designed in several silhouettes to compare and match the raw form of this device based on the samples of the mod board. And some final raw forms were extracted and models were designed based on the three final outputs, which were selected based on the criteria of being unisex and maintaining the nature of the hearing aid in the form and design. the final sample was modeled in 3D.

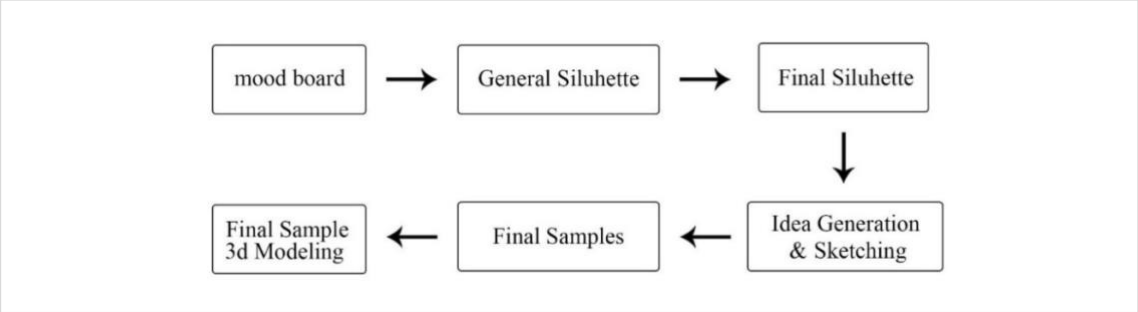

Figure 2: *The process of product modeling.*

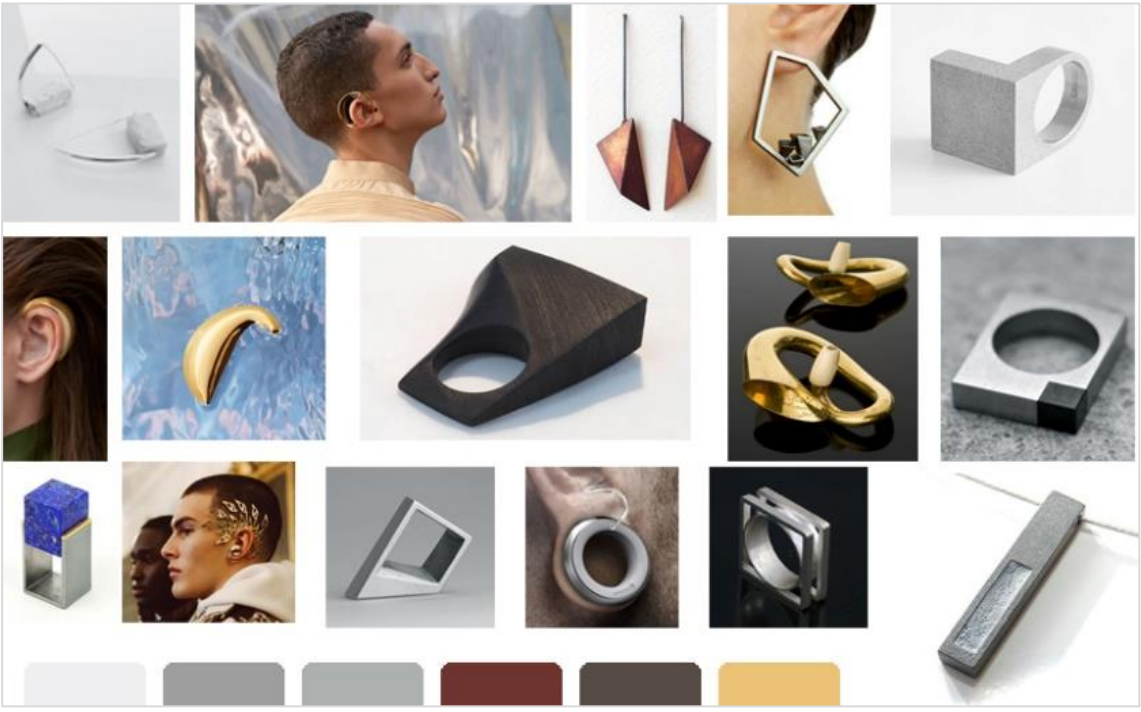

Figure 3: *Mood board.*

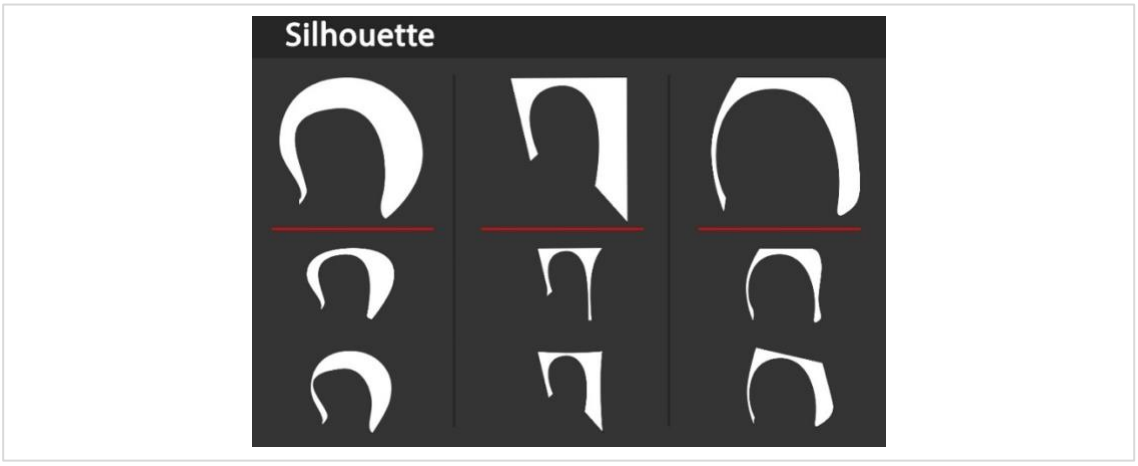

Figure 4: *Raw Silhouette 1.*

Figure 5: *Samples designed based on silhouettes.*

Figure 6: *The final 3D sample.*

Questionnaire Design

To extract users' emotions and compare the degree of arousal of these emotions between the designed sample and the products on the market, a questionnaire was designed with the standard Kansei engineering method. The steps of this method include grouping products in terms of appearance and choosing a representative, extracting Kansei vocabulary related to the product and the research's goal, setting up a questionnaire and conducting a field test, and finally analyzing and reviewing the results.

In this research, specifically, the third type Kansei engineering, which is also called backward Kansei engineering, is used, in which users are asked to express their feelings with the help of words and phrases when viewing an object or product. that they see or express about the product that they intend to buy in the future, this set of words that are mostly expressed in the form of nouns or adjectives are called Kansei words (Emami et al., 2018).

In this research, products are classified into similar groups using cluster analysis based on appearance features including form and color. 50 samples of markets products were examined (The models were identified and separated based on the appearance criteria of the form and design, and samples with a high similarity to these products were omitted). These hearing aids were compared based on the visual features of form and color and scored based on these indicators. Form and color features are the main criteria for product classification, and by assigning a score of 0 or 1 to each product, they specify its features. The scoring criteria for each product is 0 points for simple forms and 1 point for complex forms. The product is assigned a score of 0 for neutral and skin colors and 1 for other colors.

The products were grouped by clustering method with SPSS software and they were placed in three groups, which have the most similarity with the products of the same group and the most difference with the other group, and finally, the representative of each group of hearing aids with the highest score was selected. The hearing aid which is designed by writers is defined as 4th sample in a questionnaire.

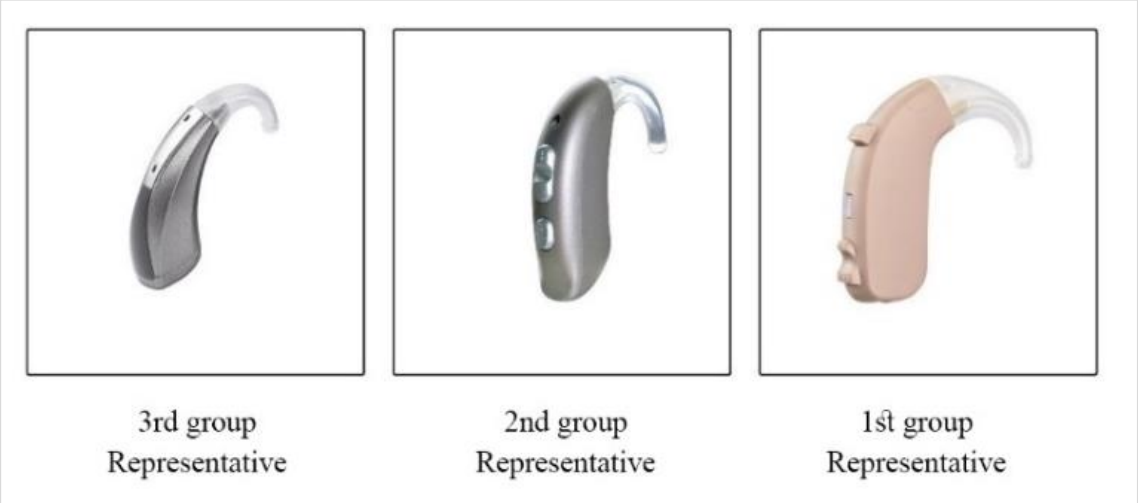

Figure 7: *The 3 groups of market products for the questionnaire.*

Using dictionaries and related articles, etc., in the first step, 200 Kansei words were extracted from product-related attributes in a divergent manner. In the following, with the cooperation of experts in the field of literature and linguistics, the words were screened and reduced to 45 words, and finally, according to the research objectives, 20 words were selected as the final Kansei words related to the product in the form of adjectives and nouns. These words have been chosen with the advice of experts in the relevant fields as the words related to emotions are relevant to self-esteem and self-image.

These words are: Unique, Expensive, Sensational, Fashionable, Exciting, Confident, Stylish, Luxurious, Stunning, Pleasant Experience, Showy, Happy, Admirable, Durable, Formal, Attractive, Impressive, Beautiful, Magnificent, Functional.

The questionnaire, using Kansei words and the image related to the representative of each product group, was designed based on a five-level semantic differentiation method. The selectable options for each word were graded from 1 to 5, where one point was given to the *not at all* option and 5 points to the *very much* option.

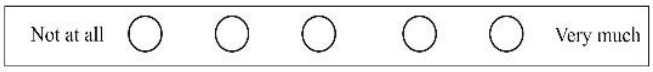

Figure 8: *Kansei questionnaire choosing box.*

Statistical Sample and Test Implementation

The questionnaire was designed in both online and paper forms, the statistical population was considered active members of the hearing loss and deaf association of Zanjan city, and the number of these people was announced as 200 people, and based on Morgan's table, 53 people were tested as a statistical sample (Participants had different levels of hearing loss and deafness and continuously used hearing aids). The case samples consist of men and women in the age range between 16 and 63 years. Each researcher considers the criteria for his study if the subject meets the criteria for entering the study, he will enter the project and if he meets the exit criteria, he will not enter the project. The entry criteria for this research were permanent use of hearing aids and willingness to participate in the research, and the exclusion criteria were complete deafness and no use of hearing aids.

Table 2: *Demographic table of participants.*

Variable		Frequency	Percent %
Gender	Male	18	34
	Female	35	66
	Total	53	100
Age Category	15-25	6	11
	26-35	11	21
	36-45	15	28
	46-55	13	25
	56 and over	8	15
	Total	53	100

Results

Based on the questionnaire, data was collected extracted, and statistically analyzed by SPSS software. for each product was calculated with Cronbach's alpha separately and also for all four products together. which is as described in the following table. The values show the reliability of the obtained data.

Table 3: *Cronbach's alpha value.*

Product Number	Reliability Statistics	
	Cronbach's Alpha	N of Items
1	0.957	20
2	0.970	20
3	0.959	20
4	0.961	20
Both Four	0.978	20

The results of the comparison of attributes in hearing aids are presented in the graph and the average score of each product in each attribute in the following tables:

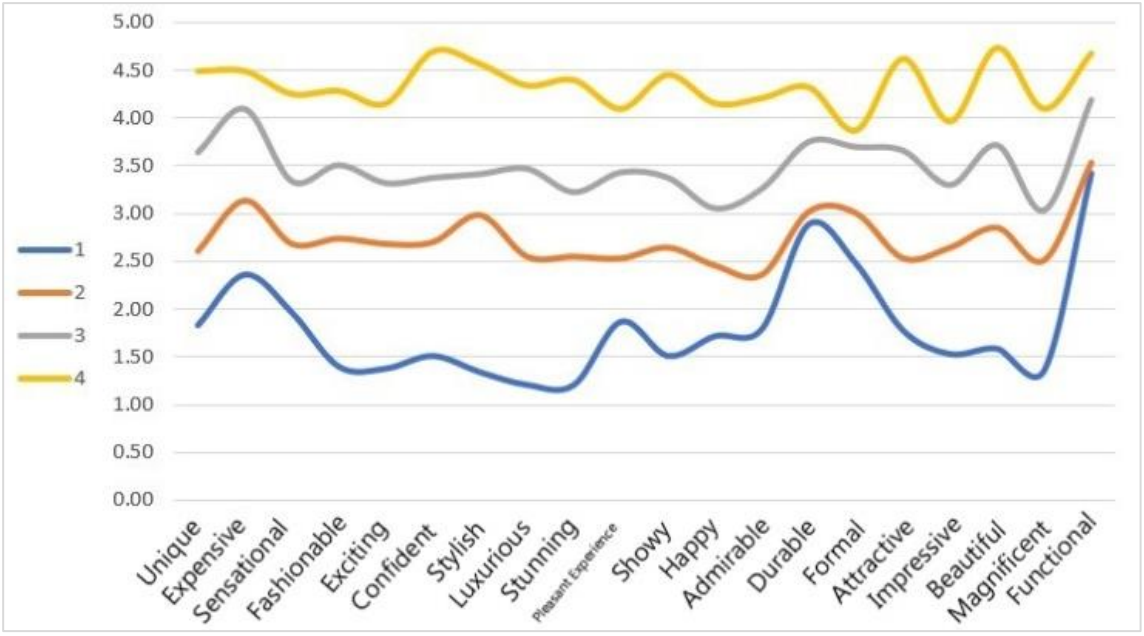

Figure 9: *Four product's Kansei traits Comparison.*

Table 4: *The average score of each hearing aid.*

Product Number	1	2	3	4
Unique	1.83	2.60	3.64	4.49
Expensive	2.36	3.13	4.09	4.49
Sensational	1.96	2.68	3.34	4.25
Fashionable	1.40	2.74	3.51	4.28
Exciting	1.38	2.68	3.32	4.15
Confident	1.51	2.70	3.38	4.70
Stylish	1.34	2.98	3.42	4.57
Luxurious	1.21	2.55	3.47	4.34
Stunning	1.21	2.55	3.23	4.40
Pleasant Experience	1.87	2.53	3.43	4.09
Showy	1.51	2.64	3.38	4.45
Happy	1.72	2.45	3.06	4.15
Admirable	1.79	2.36	3.26	4.21
Durable	2.89	3.02	3.75	4.32
Formal	2.47	3.00	3.70	3.87
Attractive	1.77	2.53	3.66	4.62
Impressive	1.53	2.64	3.30	3.96
Beautiful	1.58	2.85	3.72	4.74
Magnificent	1.36	2.51	3.04	4.09
Functional	3.42	3.53	4.19	4.68

Table 5: *Minimum and maximum values obtained for each attribute in each hearing aid.*

Product Number	1				2				3				4			
	Mean	Minimum	Median	Maximum	Mean	Minimum	Median	Maximum	Mean	Minimum	Median	Maximum	Mean	Minimum	Median	Maximum
Unique	1.83	0	1	5	2.60	0	3	6	3.64	0	4	6	4.49	0	5	6
Expensive	2.36	0	2	6	3.13	0	3	6	4.09	2	4	24	4.49	2	5	6
Sensational	1.96	0	2	5	2.68	0	3	6	3.34	0	3	5	4.25	2	4	6
Fashionable	1.40	0	1	5	2.74	0	3	6	3.51	0	4	6	4.28	0	4	6
Exciting	1.38	0	1	4	2.68	0	3	6	3.32	0	3	6	4.15	0	4	6
Confident	1.51	0	1	4	2.70	0	3	6	3.38	0	4	6	4.70	3	5	6
Stylish	1.34	0	1	5	2.98	0	3	6	3.42	0	3	6	4.57	1	5	6
Luxurious	1.21	0	1	4	2.55	0	2	5	3.47	0	4	6	4.34	0	4	6
Stunning	1.21	0	1	4	2.55	0	3	6	3.23	0	3	6	4.40	0	5	6
Pleasant Experience	1.87	0	2	5	2.53	0	3	6	3.43	0	4	6	4.09	0	4	6
Showy	1.51	0	1	4	2.64	0	3	6	3.38	0	4	6	4.45	2	4	6
Happy	1.72	0	1	5	2.45	0	3	6	3.06	0	3	6	4.15	0	4	6
Admirable	1.79	0	2	5	2.36	0	2	6	3.26	0	3	6	4.21	0	4	6
Durable	2.89	0	3	6	3.02	0	3	6	3.75	0	4	6	4.32	0	5	6
Formal	2.47	0	3	6	3.00	0	3	6	3.70	1	4	6	3.87	1	4	6
Attractive	1.77	0	2	4	2.53	0	3	5	3.66	1	4	6	4.62	0	5	6
Impressive	1.53	0	1	6	2.64	0	3	6	3.30	0	3	6	3.96	0	4	6
Beautiful	1.58	0	1	4	2.85	0	3	6	3.72	0	4	6	4.74	2	5	6
Magnificent	1.36	0	1	4	2.51	0	3	6	3.04	0	3	5	4.09	0	4	6
Functional	3.42	0	4	6	3.53	1	4	6	4.19	1	4	6	4.68	2	5	6

Findings

In the Kansei words table related to four products, the blue color corresponds to the product designed by the author, the gray color corresponds to the representative of the third group, the orange color corresponds to the representative of the second group and the blue color corresponds to the representative of the first group.

According to the diagram, the designed product (number 4) has the greatest difference from the representative of group 1, which has a functional design with minimal processing in form and other visual elements, and has the least difference from the representative of group 3. The highest points obtained by the designed hearing aid are related to the attributes *beautiful* and *confident*.

The representative of group 3 obtained the highest values of these attributes after the designed one, and the lowest values of these attributes were obtained by the representative of group 1; Also, the designed sample in the attractive attribute got a high score, which shows the high attractiveness of this product in the mental image created for users.

Most difference in the score of the designed product with the next product with the highest scores, i.e. product number 3, is related to the word confident, and the lowest difference between these two products is related to the official adjective. Also, the biggest difference in attributes between products is related to the attribute *confident*, the highest value is obtained by the designed product, and the lowest value is related to the representative of group 1.

Figure 10: *The pattern of each hearing aid separately.*

The four products have a significant difference in the attributes *stylish*, *luxury*, *stunning*, *pleasant experience*, *happy*, and *admirable*. the highest score in words related to the self-image of the users is observable in the designed sample. the lowest score is related to the representative of the first group, which has the lowest scores in the attributes It is stunning and luxurious. Among these attributes, the designed hearing aid has received the highest score in the term *stylish*.

In the *expensive* attribute, all four products scored between 2 and 4.5 points. the difference between the designed sample and the representative of group 3 is less than half a unit. the users see the designed sample as more fashionable than the representatives of other groups.

Discussion and Conclusion

This research is done to use the principles and aesthetics of jewelry with the approach of emotional design concepts to change the negative views that may be caused by the use of hearing aids. Studies show that beauty and the desire for beauty are an integral part of human life, and this issue is also reflected in the artifacts used. statics has always been an important part of decorations and also is known as an integral part of jewelry, which is always used for different purposes by people in different societies and helps a person to express himself, his interests, tastes, and opinions.

On the other hand, in emotional design, the concepts of *self* and *self-image* of users are at the center of attention. This self-image is one of the highest goals in this design approach, which is achieved by using 3 levels of mind processing, especially at the highest level (cognitive level).

These positive feelings can be created in people through the products they use. This concept creates a pleasant experience and improves the self-image people have as well as how they expect others to see them. One of the most important factors in creating this concept is formed through the products he uses, which in a product like a hearing aid is a factor that affects the image of the consumers of this device. As a result, it increases their self-esteem.

The results obtained from this research show that the emotional design approach, as a platform consisting of three cognitive levels, provides a method for applying the aesthetics and concepts of jewelry in industrial products such as hearing aids. This influence happens through visual elements including form, material, and color. the concepts resulting from the intersection of these two areas of design can be used in a direction that specifically targets and influences users' emotions such as self-image and self-esteem by using emotional design techniques and evaluation methods such as Kansei engineering.

As an answer to the studies hypotheses, Measuring the feelings of users towards hearing aids designed as jewelry compared to other products in the market, shows positive feelings towards the appearance of this product, which shows a greater desire to display this hearing aid users and a sense of high self-confidence them, this can be directly related to people's self-image and their self-esteem and it has also caused more positive emotions related to aesthetics compared with other measured samples, So it can be concluded using the aesthetics of jewelry and the principles related to the design of its visual elements can influence society's view of these products by creating positive feelings in hearing aid users and other audiences And change its role from a product that is only a rehabilitation assistant and a sign of a kind of disability to a beautiful product that can play the role of jewelry.

In the following, and to continue this study, the authors propose to study the effect of the Aesthetics of Hearing aid jewelry on its functional quality by comparing it with the other existing samples with completely identical functional characteristics to examine the connection between jewel appearance and its effects on users' experience of its function.

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